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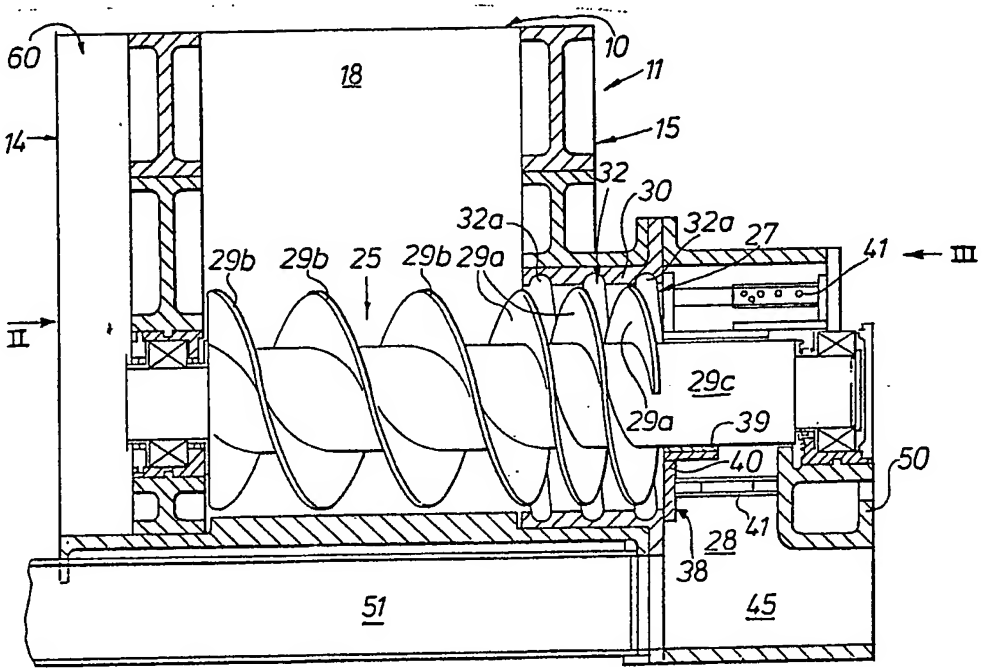

(57) Abstract

Materials handling means (11) for feeding particulate materials into a pressurised fluid conveying system (51), includes a housing (14-15) having a material receiving zone (18) into which material to be fed to the system is deposited, an outlet chamber (28) connectable to said system, and compaction means (29, 30) for compacting the material and continuously feeding the material from the material receiving zone (18) and into the outlet chamber (28) and thereby creating a seal between the outlet chamber (28) and the material receiving zone (18) to prevent ingress of pressurised fluid into the material receiving zone (18).

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MATERIALS HANDLING MEANS

The present invention relates to a materials handling means in particular to a materials handling means which is capable of feeding broken/sized materials into a fluid transport system.

According to one aspect of the present invention there is provided materials handling means for feeding particulate material into a pressurised fluid conveying system, the materials handling means including a housing having a material receiving zone into which material to be fed to the system is deposited, an outlet chamber connectable to said system, and compaction means for compacting the material and continuously feeding the material from the material receiving zone and into the outlet chamber and thereby creating a seal between the outlet chamber and the material receiving zone to prevent ingress of pressurised fluid into the material receiving zone.

In use, the outlet chamber forms part of the fluid conveying system so that material delivered into the chamber is transported away by the fluid.

Various aspects of the present invention are hereinafter described with reference to the accompanying drawings, in which:-

Figure 1 is a sectional view of an embodiment according to the present invention taken along line I-I in Figure 2 with the breaker drums omitted for reasons of clarity;

Figure 2 is a side view of the embodiment shown in Figure 1 as viewed in the direction of arrow II; and

Figure 3 is a side view of the embodiment shown in Figure 1 as viewed in the direction of arrow III.

A material handling means according to the present invention is shown generally at 10 and includes a housing 11 which rotatably houses a pair of breaker drums 12. As seen in Figures 2 and 3 the end walls 14, 15 of the housing are generally triangular in shape so that the side walls 18, 19

converge toward one another to meet at the base of the housing. In the particular embodiment shown, the periphery of each drum 12 passes in close proximity with an adjacent side wall so that on rotation of the drum teeth (not shown) carried by the drum may co-operate with the adjacent side wall (or teeth carried thereon) to break material, the broken material then falling toward the base of the housing which forms a material receiving zone. A screw conveyor 25 is located at the base of housing 11 to receive broken material falling from drums 12 and is arranged to convey the broken material out of the housing 11 through an outlet port 27 into an outlet chamber 28.

As seen in Figure 1, the outlet port 27 is located at one end of a conduit 30 which is provided on its internal periphery with a helical groove(s) 32. The convolutes 29a of the helical flange 29 of the screw conveyor housed within the conduit 30 are more closely spaced than the convolutes 29b of flange 29 located directly below the drums 12. The axial spacing between convolutes 29a and the axial spacing between the convolutes 32a of groove(s) 32 are chosen so that material entering and travelling along conduit 30 is packed together. The axial spacing between convolutes 29b is chosen to ensure material being delivered by the drums 12 is moved quickly away and into conduit 30. The groove 32 is such as to tend to cause material to move away from the outlet port 27, and this action, in combination with that of the screw conveyor causes compaction of the material before it reaches the outlet port.

The outlet port 27 is closed by a cap 38 which includes a sleeve portion 39 and an annular flange 40 which abuts against the end of conduit 30. The sleeve portion 39 is slidably mounted on shaft 29c of the screw conveyor and springs 41 are provided for biasing the cap 38 to engage the end of conduit 30.

As clearly seen in Figures 1 and 3 the outlet chamber 28 is provided with a conduit portion 45 which at one end is provided with a connecting flange 50 and is adapted at the other end to receive a pipe 51.

In use compressed air is blown along pipe 51 and through

conduit portion 45. A pipe system (not shown) is attached to flange 50 so that material falling into conduit portion 45 is conveyed away. The cap 38 serves the purpose of preventing compressed air exiting through the outlet chamber 28 and into the remainder of housing 11. During use, material conveyed by the screw conveyor through conduit 30 presses against cap 38 and moves it away from the end of conduit 30 to allow the material to fall through outlet port 27 and into the conduit portion 45. Whilst cap 38 is in a position spaced from the end of conduit 30, the packed material within conduit 30 provides an effective seal to restrain ingress of compressed air into the remainder of housing 11. Since cap 38 is maintained in its spaced position from the end of conduit 30 by virtue of the material being extruded through outlet port 27 it will be appreciated that as soon as there is an absence of material passing through port 27 the cap 38 will again abut against the end of conduit 30. Consequently compressed air within outlet chamber 28 is always effectively restrained from entering the remainder of housing 11.

In the described embodiment, two breaker drums 12 are provided with drive gears 12a which intermesh with one another. As illustrated in Figure 2, one drive gear 12a drives a gear 40a mounted on the shaft of the screw conveyor via an idler gear 40b.

Accordingly, the speed of rotation of screw conveyor is directly dependent on the speed of rotation of the drums. The choice of gear sizes is preferably such that the speed of rotation of the conveyor is greater than that of the drums. The gears 12a, 40a and 40b are housed in a gear housing 60 which forms an integral part of housing 11.

It will be seen from Figure 1 that the use of an annular port 27 and cap 38 permits the screw conveyor shaft 29c to be supported by bearings at each end of the shaft, giving considerable advantages in strength and wear in comparison with support at the end only with the screw portion projecting freely.

Although the present invention has been described in

connection with a twin drum material breaker/sizer it will be appreciated that any number of breaker drums may be provided and may be arranged to effect breaking/sizing of mineral or other materials in any known manner.

Additionally it is also envisaged that breaker drums may be omitted in cases where sized mineral or other materials is available for feeding to the material handling means.

CLAIMS

1. Materials handling means for feeding particulate material into a pressurised fluid conveying system, the materials handling means including a housing having a material receiving zone into which material to be fed to the system is deposited, an outlet chamber connectable to said system, and compaction means for compacting the material and continuously feeding the material from the material receiving zone and into the outlet chamber and thereby creating a seal between the outlet chamber and the material receiving zone to prevent ingress of pressurised fluid into the material receiving zone.

2. Materials handling means according to Claim 1, wherein the compaction means includes a conduit extending between the material receiving zone and the outlet chamber and a screw conveyor for positively feeding material through the conduit, the conveyor and conduit co-operating to compact said material.

3. Materials handling means according to Claim 2, wherein the screw conveyor includes a first portion which rapidly moves material to the conduit from the material receiving zone and a second portion located within the conduit whhich serves to compact said material.

4. Materials handling means according to Claim 3, wherein the screw conveyor includes a helical flange, the convolutes of which along one axial portion are relatively widely spaced to define said first portion and the convolutes of which along another axial portion are relatively closely spaced to define said second portion.

5. Materials handling means according to Claim 3 or 4, wherein the inner wall of said conduit is provided with at least one helical groove for co-operating with the screw conveyor to create compaction of material within the conduit.

6. Materials handling means according to any preceding claim, wherein valve means are provided for preventing escape of fluid from the outlet chamber and into the material receiving zone whilst material is not being conveyed into said outlet chamber.

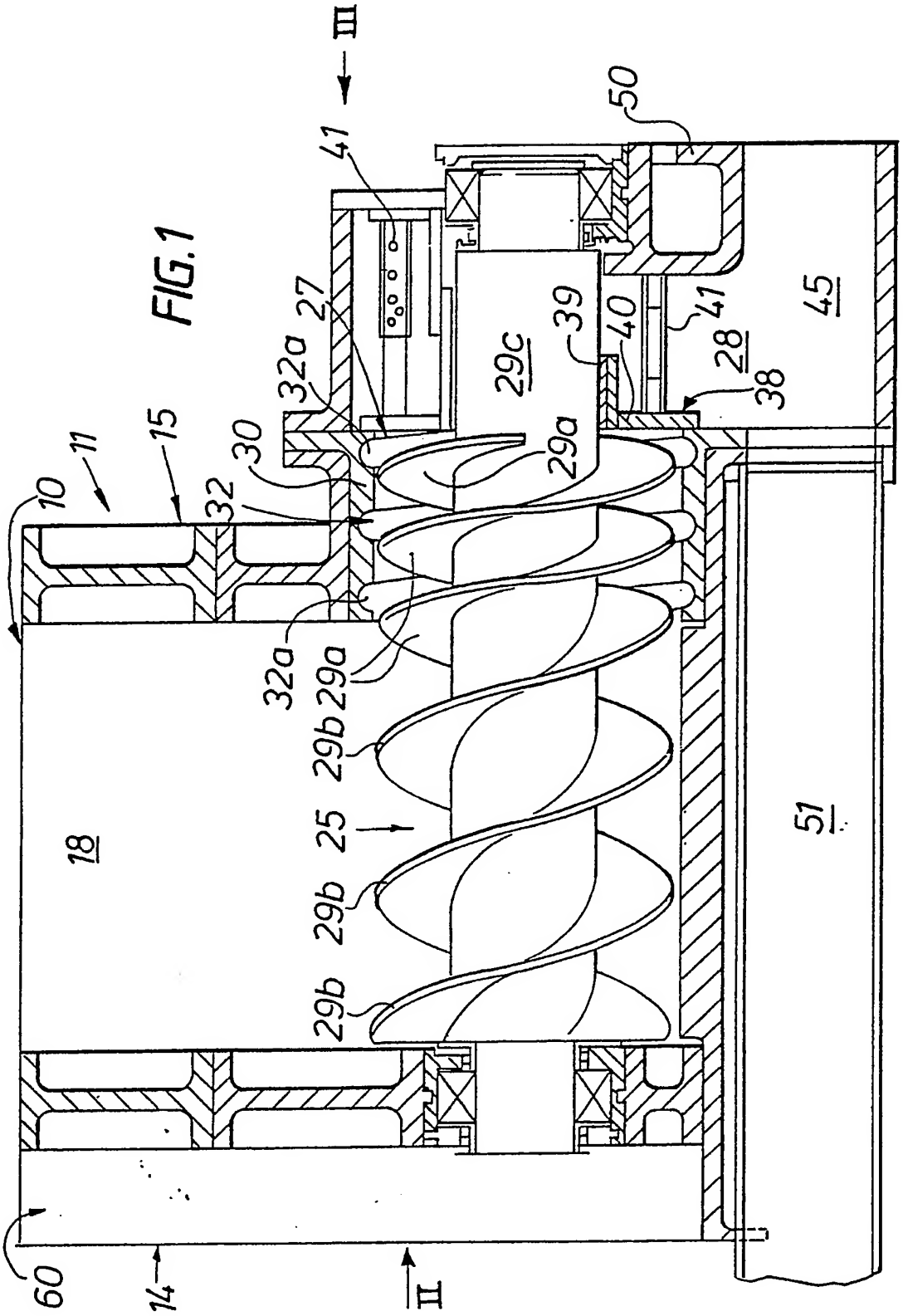
7. Materials handling means according to Claim 6 when dependant on Claim 2 wherein the valve means includes a valve element biased into sealing abutment with the outlet port of the conduit, the valve element being moved against its bias away from the outlet port by material being fed through the conduit.

8. Materials handling means according to any preceding claim, wherein at least one breaker drum is rotatably mounted in the housing for feeding broken material to said material receiving zone.

9. Materials handing means according to Claim 7, wherein a pair of breaker drums are provided.

10. Materials handling means for breaking material and feeding particulate material to a remote location, the material handling means including a housing in which is rotatably mounted at least one materials breaker drum for breaking material delivered to the materials handling means, a broken material receiving zone for receiving material from the breaker drum(s) and a screw conveyor rotatably mounted in the housing and arranged to convey broken material from the material receiving zone to a position outside of said housing.

FIG.1



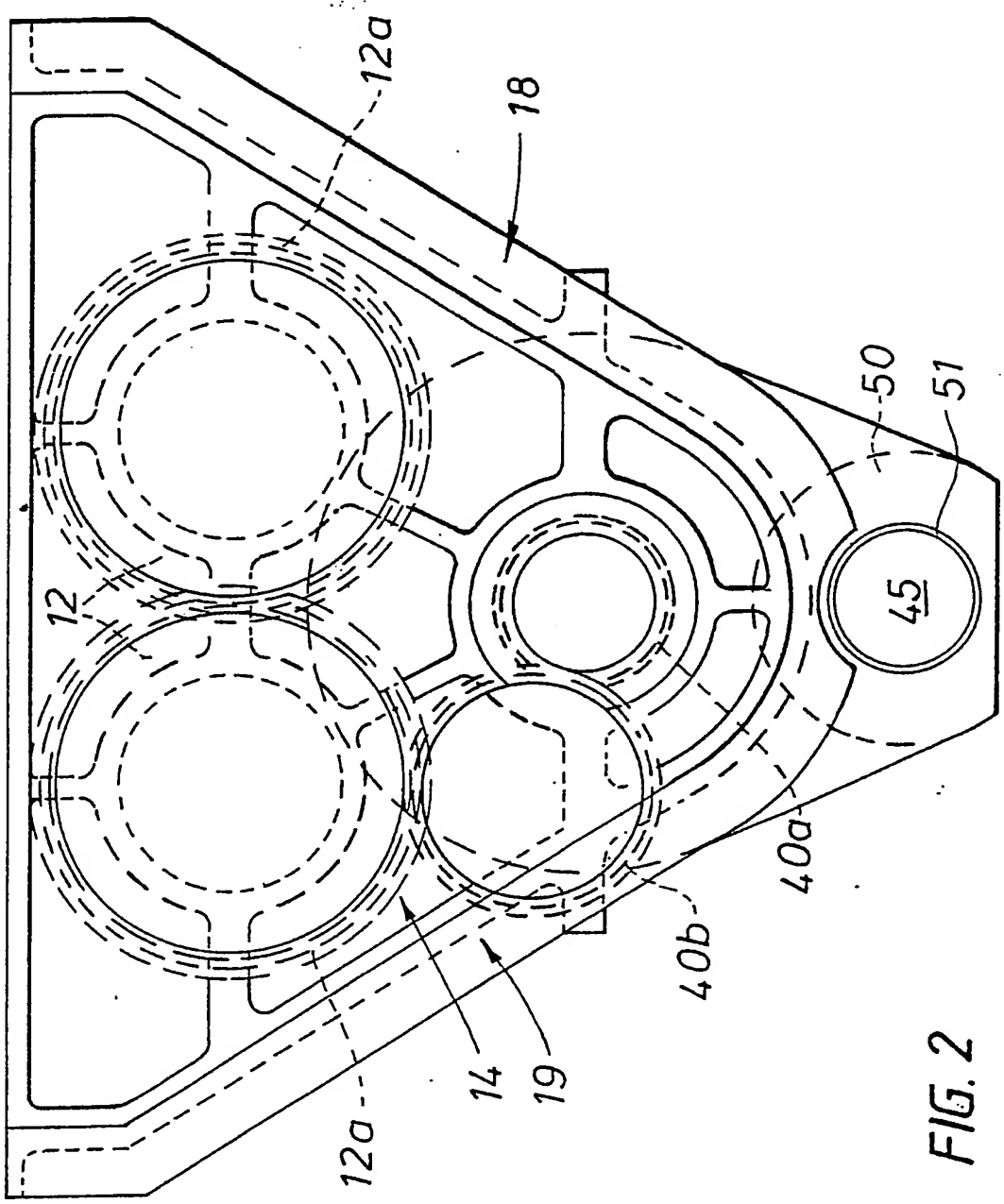


FIG. 2

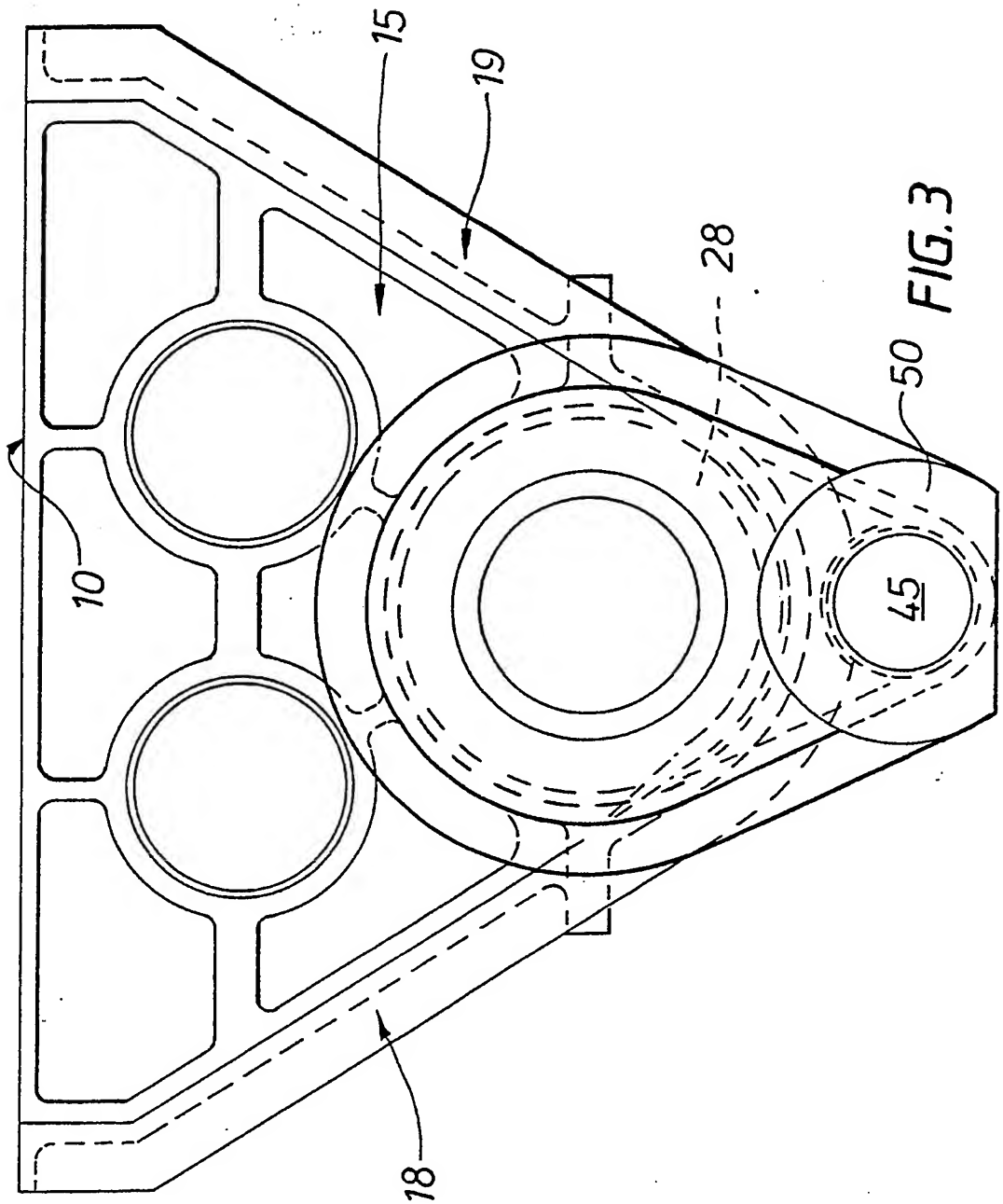


FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 82/00218

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC[3]: B 65 G 53/48

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC[3]	B 65 G; B 65 D

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X	EP, A, 0041279 (NIEMEIJER) 9 december 1981, see page 3, line 2 to page 4, line 15; figures	1,2,6,7
X	BE, A, 475453 (EUROPESE FULLER VERVOER-MAATSCHAPPIJ N.V.) 30 September 1947, see page 3, line 28 to page 4, line 17; figures	1,2,3,4, 6,7
A	US, A, 3862594 (STÖLTING) 28 January 1975, see abstract; figures	1,2,5
A	FR, A, 2156446 (O'TOOLE) 1 June 1973, see claims 1,4,5,6	8,9,10
A	US, A, 3756434 (TESKE) 4 September 1973, see abstract + figures	1,2,6,7

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* Special categories of cited documents: [15]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
13th October 1982	29th October 1982
International Searching Authority [1]	**Signature of Authorized Officer [20]**
EUROPEAN PATENT OFFICE	G.L.M. Kruydenberg

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